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A JOURNEY UP THE YUKON RIVER.

BY

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The Yukon river has its source in the mountains near the coast in the northwestern portion of Canada and flows in a curving course, first northwest and then southwest, through Alaska and empties into Bering Sea. Its length, including its many windings, is from 2,000 to 2,500 miles; and the area it drains in the neighborhood of 440,000 square miles. Next to the basin of the Mackenzie, the region drained by Alaska's great river is the least known of any of the larger river valleys of North America.

In the summer season of 1889, I accompanied an expedition sent out by the U. S. Coast and Geodetic Survey for the purpose of marking the localities where the Alaska-Canadian boundary crosses the Yukon and Porcupine rivers, respectively. My connection with the expedition was that of a geological *attaché*, as I was sent by the Director of the U. S. Geological Survey, for the purpose of making such observations on the character and resources of the country as the nature of the journey would allow. The expedition consisted of two independent parties in charge of Mr. J. E. McGrath, and Mr. J. H. Turner.

Preparations for a two years' sojourn in the Arctic were made in San Francisco, and on June 14 we sailed for Unalaska, on the steamer *Bertha*. After a brief stay at Unalaska, during which our equipage was transferred to the steamer *St. Paul*, we crossed Bering Sea, and on July 7 anchored in shallow water about a mile off shore, near the little trading station known as St. Michaels. This is the customary point for transferring to river steamers in order to ascend the Yukon, the nearest entrance to which is about 70 miles to the south. Owing to shallow water and the absence of surveys, ocean-going vessels do not attempt to enter any of the

many mouths into which the Yukon divides before reaching Bering Sea.

St. Michaels is considerably changed from the Redoubt St. Michaels', founded by the Russian American Fur Company in 1833. The palisade of the old stronghold is gone, but two of the block houses, pierced for cannon and musketry, still stand at the rear of more modern buildings, and occasionally serve as guard houses. The octagonal church, painted red and surmounted by the double cross of the Greek church, tell that the established religion of Russia still holds sway, although the flag of the United States floats near at hand. The settlement is still a trading post, but has passed into the hands of the Alaska Commercial Company, who, at the time of our visit, held the lease of the Seal Islands, and controlled the entire fur trade of western and central Alaska. The principal buildings are built of logs, the better ones having an outside covering of boards, and form three sides of a rectangle. The space thus enclosed corresponds in a general way to the plaza in a Mexican village, and is the scene of many picturesque gatherings.

The little settlement had just awakened from its winter's sleep, and was thronged with natives from villages scattered along the coast and from several widely separated points in the interior. The most distant travellers were from the Porcupine river to the east of the Alaska-Canadian boundary, some 1,500 miles away. Besides the natives there were missionaries of several denominations; agents of "The Company" from interior stations, miners from the gold fields on the upper Yukon, officers and sailors from the U. S. S. *Thetis*, anchored in the roadstead, a number of mechanics brought on the *St. Paul* who were to construct a new steamer for the Yukon trade, and the Coast Survey parties, numbering over twenty men. A more cosmopolitan assemblage could scarcely be found in North America outside of Alaska. The natives represented several of the subordinate divisions of the two great aboriginal stocks, Eskimo and Indian, of North America. The white men included but few native-born American, but nearly every country of Europe from Finland to Greece was represented. As is the case the world over when a band of adventurers assemble, the Jew was present, and as usual ranked among the more prosperous members of the community.

The gathering of so many strangers at St. Michaels gave the place a holiday aspect. To entertain the visitors, the traders in charge of the station arranged for a native dance in the square in front of the store, in which a score or more of the Eskimo inhabit-

ants participated. The audience consisted of white people, including the wives of some of the traders, Indians, Eskimos, children, dogs, etc., and was even more picturesque than the dancers, clad in their holiday garments of seal skin and reindeer fur. Music was furnished by a number of tambourine-like instruments, made of seal-membrane stretched tightly over a frame shaped not unlike a tennis racket, and beaten by the hand. Various phases of Eskimo life, including hunts on sea and land, were described in extemporized chants, accompanied by pantomime, in time with the music. Some of the very oldest members of the community, carried away by the excitement of the occasion, joined in the festivities, and showed how such events were celebrated when they were young, much to the amusement of the rising generation.

While the *St. Paul* was slowly discharging her freight with the assistance of lighters, and of a small steamer called the "*Yukon*," in which we were to ascend the great river after which it was named, the scientific work of the expedition was begun by Messrs. McGrath and Turner, who made magnetic observations in tents on shore. My time was occupied in tramping over the adjacent moorland and in climbing some of the low volcanic hills a few miles inland. The country about St. Michaels is typical of a vast region bordering the shores of Bering Sea and the Arctic Ocean, for which the Siberian name *tundra* has been adopted. This desolate tract is a treeless morass, carpeted with a luxurious growth of mosses and lichens, and beautified during the short summer by a wealth of brilliant blossoms. A few inches below the flower-strewn surface, however, the soil is always frozen and a sheet of ice more or less mixed with partially decayed vegetation, and of unknown thickness, underlies nearly the entire tundra country. Like the peat bogs of temperate latitudes, the plants of the tundras grow above at the same time that they die and partially decay below, but complete destruction of the vegetable tissues is arrested by the frost, and the deposit increases in thickness from year to year and from century to century. In the frozen bogs forming a belt a hundred miles or more broad, about the northern shores of both the Old and the New World, it is safe to say there is more carbonaceous matter than in the workable coal fields of America. Geologists may yet find in the northern bogs an explanation of the origin of some coal deposits. The surface of the tundra abounds in lakes and ponds, and, in fact, in many places contains more water than land; or, rather, there is scarcely any land at all over large areas, but only hummocks of wet moss into which one sinks knee deep at every step.

When preparations were finally completed and the little stern-wheeled steamer *Yukon* was loaded for the river journey, those who were to take passage in her carried their personal effects on board and settled down in the cramped and not over-clean quarters as best they could. Beside the freight stowed away, no one seemed to know where, on the steamer itself, three lighters were taken in tow, each of which was heavily laden, and served also to house the camp hands, and a few other passengers. Meals were served in the diminutive cabin of the steamer, and, as many relays were necessary, a meal, or the odor of its preparation by the Eskimo cook, seemed always in progress.

The crew of the *Yukon* consisted of a captain of Scandinavian birth, an engineer from Finland, and a dozen or more Eskimos. The natives acted as pilots, assistant engineers, firemen, wood choppers, etc., and did their work with remarkable efficiency. Even when the rough captain was too drunk to manage affairs, the crew navigated dangerous rapids, and made landings for wood, in a way that spoke volumes for their intelligence and faithfulness.

The first stage of our journey was along the coast of Bering Sea, and was a risky passage for the *Yukon*, especially when encumbered with lighters in tow. The weather was calm, however, and the water smooth. In spite of a dense fog that settled down over the yellow sea, before the passage was half completed, we succeeded in reaching Kwikhpak channel, one of the numerous streams into which the Yukon river divides on its delta, without serious delay. Low bluffs then enclosed the muddy waters on either hand, and from the top of the pilot house we could see far out over the intensely green surface of the great marsh through which we were sailing.

Slowly our little steamer struggled against the current, and at length passed the entrance of the highest of the distributaries through which the mighty river discharges its waters. The head of the delta is a hundred miles from the sea; the distance about its seaward margin is about 70 miles. Enclosed by the low swampy lands, made largely of river silt, are uplands of older date standing like islands in the sea of grass and moss.

For some two or three hundred miles above the head of its delta, the river spreads out between low shores, and in places is many miles broad; so wide, in fact, that an observer standing on the bluffs forming its right bank, cannot distinguish the land to the south. It seems like a sea of yellow water, but the current even in the broadest part is so strong that its true character is unmis-

takable. The Yukon throughout nearly its entire length is a muddy, silt-laden stream.

Stops of a few hours were made at the principal native villages, and many were the picturesque scenes that awaited us as we went ashore, and visited the fur-clad people in their homes. For a distance of 150 miles from Bering Sea the people are Eskimos, and live in comparatively well-built houses, usually situated in the shelter of some projecting headland, where fish are abundant. Food is obtained mainly from the river. Large racks filled with drying salmon sometimes gave a pink tint to the village sites before the individual houses could be distinguished.

Many of the houses were literally filled from floor to roof, with salmon hung on poles with bark troughs below to catch the dripping oil. A fire smouldering on the floor in the centre of each house, filled it with dense smoke which finally escaped through a hole in the roof. Our visits to these houses necessitated that we should crawl in on our hands and knees, beneath the mass of drying salmon, in order to reach the small open space in the centre where the people crowded about the fire. The density of the atmosphere and the indescribable odor of these combined dwelling and smoke houses usually made our visits as brief as courtesy would allow.

A call was made at the Catholic Mission near Andreieffski, in charge of Sisters whose previous home was near Quebec. The log house in which the Sisters lived had one room fitted up as a chapel, with a shrine made by a carpenter Brother. The home of these devout women was the only oasis of cleanliness that I found in Central Alaska. The largest and most interesting villages on the lower Yukon are Anvik, Nulato and Nukulukahyet, at each of which we remained for a few hours, and learned something of the people and of their country. Soon after leaving Nukulukahyet, near where the Tananah river joins the Yukon from the south, we awoke one morning and found our little steamer struggling with the strong current where the river passes between bold bluffs known as the Lower Ramparts. For an hour or more no perceptible advance was made, and at times the little boat was carried slowly down stream in spite of its quick puffing and the cloud of spray thrown up by the large paddle-wheel at the stern. As a last resort, a heavy wrench was hung on the safety valve, in disregard of all regulations of steamboat inspectors, and sufficient steam pressure obtained to enable the brave little craft to ascend the swift water and gain the broad quiet reach of the river above.

The banks of the Yukon are forested, except on the delta. In the Alaskan portion of its course the forests are dense, with thick undergrowth, but nearer its head waters the uplands are without



YUKON RIVER NEAR THE LOWER RAMPARTS.

trees and covered with luxuriant grasses. The prevailing trees are white spruce, growing in closely packed ranks, and seldom attaining large size. Aspens and willows flourish near the streams and, as autumn approaches, form a fringe of yellow along their banks. When looking down on the forest from some commanding station, the avenues of yellow outlined in the tree tops were frequently the only means of judging of the positions of the streams flowing beneath.

Many landings were made for the purpose of obtaining wood for engine fires. As trees had to be felled and cut into the required length, these delays caused a serious loss of time, but afforded opportunities for seeing something of the adjacent country. The halts for wood, however, were usually made at night when the light was too uncertain to admit of safe navigation, but sufficient, especially if increased by a blazing fire, to allow the wood-choppers to work. The night scenes when a dozen swarthy Eskimos, stripped to the waist, wielded their axes in the shadows of the dense forest, while the *Yukon* was tied to the neighboring bank, were always attractive, and rendered the tedious delays much more endurable than if there had been no activity to enliven the scene.

Throughout the length of the Yukon, one is frequently reminded of the high latitude of the region drained by the great river, by seeing strata of ice in the recently cut banks, beneath the dense layer of moss and roots forming the surface on which the forests grow. One may frequently find ice even on a hot summer's day, by scraping away the moss at his feet. In some instances the frozen layer has been penetrated to the depth of twenty-five feet, but its full depth has never been ascertained. In the banks of some of the streams to the north of the lower Yukon, strata of ice over a hundred feet thick have been observed, and the indications are that its total depth is considerably greater than the portion exposed. This sub-soil ice is stagnant, and without the characteristics of glaciers. It is thought by some observers, to be an inheritance from a former period of extreme cold; but under existing climatic conditions, when ice forms beneath a layer of moss, it is preserved during the short summer, and may increase as it does on the tundras, to an astonishing thickness.

The Yukon is covered with a thick layer of ice during the winter and in the spring thawing begins and the river "breaks up," as it is termed, on its head waters while winter still chains its lower portion. The result is that ice dams are formed and immense floods occur. The swollen waters, freighted with ice, submerge the adjacent flat lands and islands, and cut down the trees that cover them. In many places we found the trees either cut off at a general level of a few feet above the ground, or battered and worn by the ice that had pounded against them. Fragments of floating ice, frequently freighted with gravel and even with boulders three or four feet in diameter, are left on the sand flats when the flood subsides, and on melting deposit their loads in confused piles. In some instances, intersecting ridges, composed of sand and gravel that had been washed into cracks between large ice cakes, form a pattern on the shore resembling Hebrew letters. A person not familiar with the origin of their strikingly symmetrical figures, might easily fancy that they were of artificial origin, and intended to convey meaning.



SUB-SOIL ICE ON THE BANK OF THE YUKON.



During the short hot summer, in Central Alaska, when the sun scarcely descends below the horizon, insect life is abundant and mosquitoes and flies make miserable the lives of both men and beasts. When venturing into the forests we wore netting over our heads and gloves on our hands, but even then suffered from the relentless attacks of the millions of insects that swarmed on every hand. When my companions were concealed from me by dense vegetation, I could frequently locate their position by the cloud of mosquitoes that hovered over them and accompanied all of their movements. So vicious and untiring are these pests of the air that life could not be long maintained if one was not well protected from their attacks. Wild animals are sometimes worried to death by the countless hosts of winged things.

On nearing the site of old Fort Yukon, just above where Porcupine river joins the main stream, we passed to the north of the Arctic circle, but instead of experiencing Arctic severity of climate, suffered from the intense heat. The temperature in the shade was at times above a hundred degrees of the Fahrenheit scale. There was scarcely any relief from the heat at night, for the reason that practically there was no night, but only a prolonged twilight connecting the discomforts of one day with those of the succeeding day.

At the site of old Fort Yukon, of which the ruin of a chimney is now the only conspicuous object, Mr. McGrath and his party disembarked, for the purpose of making magnetic observations and beginning a survey of the Yukon river, while the steamer ascended the Porcupine with Mr. Turner's party.

The side trip up Porcupine river was wholly in Arctic lands. After ascending the tortuous stream for perhaps fifty miles, we emerged from the low forested tract, characteristic of the country along the middle course of the Yukon, and entered a hilly region where bold uplands covered with luxurious grass intervened between the forest-bordered streams. Dark spruce forests and groves of cottonwood and willows fringed the river banks and extended in narrow lines up each depression among the hills. On climbing some of the grass-covered summits rising a few hundred feet above the river, I obtained wide reaching views of the rolling uplands, bordering the winding river valley. Hills succeeded hills as far as the eye could reach. To the northwest suggestions of mountains could be distinguished through the hazy atmosphere. The aspens in the lowlands just changing to yellow-green, told that the charms of the northern summer would soon be blotted out, but the subdued

and mildly diversified landscape held naught else that suggested Arctic severity. It needed but a farm house or two with pasturing cattle in the grassy meadows, to transform the remote uninhabited land into a picture of New England.

The Porcupinè, like most of the tributaries of the Yukon from the north, is a swift, clear stream, with many windings. In its upper course it flows between bold hills with but little flat land along its shores. Our little steamer, the first that ever ventured on its waters, struggled against the rapid current for ten days, when the water became too shallow to admit of farther advance.

Observations for longitude showed that we were still several miles west of the 141 meridian, which treaties have decided shall be the eastern boundary of Alaska. When the *Yukon* could proceed no further, the surveying party transferred its goods to a camp on shore, and the steamer on which I was the only remaining passenger began her swift voyage down the river. On returning to Fort Yukon, Mr. McGrath and his party took up their previous quarters on the steamer, and the journey up the Yukon river was resumed. On reaching the locality where the boundary was supposed from previous observations to cross the river, a landing was made and the boat returned to Fort Yukon for supplies that had been left there temporarily. This delay enabled me to spend a number of pleasant days at Camp Davidson, as Mr. McGrath's station was named, and to explore some of the adjacent country.

Camp Davidson had been previously occupied by a surveying party sent by the Canadian government, who built a commodious log house, in which they passed a winter. The house was still in good repair, and was at once cleared out and enlarged. An observatory of logs, built over the stump of a large tree which served for an instrument pier, was also found standing and was at once fitted up for use.

Over the large Russian stove built of stones, in the cabin, hung a magnificent pair of caribou antlers, which told that game could be expected in the neighboring forest. During my lonely climbs in the adjacent mountains, I found abundant signs of moose and bear, but was not fortunate enough to see large game. The trails of mountain sheep and mountain goats were abundant at elevations of about 3,000 feet. The river was known to abound in salmon at certain seasons, and grayling or Arctic trout, were said to be plentiful. Taking all in all, Camp Davidson seemed to be an excellent place in which to pass an Arctic winter.

When the *Yukon* returned to Camp Davidson, I bade good-bye

to my friends, who, as it chanced, remained there for two years, and resumed my voyage up the river.

The struggle of the little steamer against "strong water" was resumed; the monotony being relieved by brief stops at the widely scattered Indian villages. The few natives that we met were a low type of the great Athabaskan family, and lived in wretched villages in which the dogs, used to draw sleds in winter, sometimes outnumbered the people. The vegetation bordering the river is so dense that scarcely a trail has been made through it. The streams are the highways of travel, both summer and winter. The canoes used on the upper Yukon are built of birch bark, with sharp ends, and have a small decking of bark at both prow and stern. Occasionally

they are tastefully decorated with beads or colored porcupine quills. They are even more graceful on the water than the canoes with high curved ends, familiar in the waters draining to the St. Lawrence, and so light that a man can easily carry one in a single hand. In deep water a paddle is used, but in ascending streams in shallow water, progress is made by means of two slim poles, one held in each hand of the occupant and pushed against the bottom.



A MINER'S FAMILY ON THE UPPER YUKON.

On our way up the Yukon we called at the mouth of Forty Mile creek, where there are a few log houses and a store. This is the centre of trade for the gold fields on Forty Mile creek and neighboring streams. Gold is found in the gravel along the upper Yukon and many of its branches over a wide area, but owing to the severity of the winters and the high price of provisions, only the richest "washings" have as yet received attention. The miners are a rough, hardy race, made up, it would seem, of representatives of nearly every nation on earth. Some are typical frontiersmen, dressed in buckskin, who are never at home except on the outskirts of civilization. Others were of doubtful character and it is said are seldom known by their rightful names. The remote gulches of the Yukon country seem to offer safe asylums for men who are "wanted" in other districts. Despite the varied character of its inhabitants, this remote community is orderly and but few dis-

turbances have been known. Summary punishment would follow any breach of the public peace. Morality, as understood in more refined communities, is conspicuous by its absence. Many of the miners and traders throughout the length of the Yukon live with Indian women and many are the bright-eyed half-breed children to be seen in the villages. In some instances these unions are legal marriages, but in the majority of cases the Indian mother is deserted after a year or two, when the spirit of adventure leads her companion to other diggings or to fresh hunting grounds.

After leaving the isolated community at Forty Mile we called at the mouth of Stewart river, where there is another trading station, and also at Fort Reliance, which is now abandoned. As the weather was stormy our captain ordered his men to tear down the only remaining house that marked the site of the old post, which figures somewhat conspicuously in the local history of the region. This vandalism was regretted by the hunters and traders who were present, as the house was the only refuge for many scores of miles.

On the first of September, we reached the mouth of Pelly river, opposite the site of old Fort Selkirk. Many names to be seen on the maps of the upper Yukon are records of the western advance of agents of the Hudson Bay Company; in the same way that the unpronounceable names on the lower arms of the same stream indicated the former presence of the Russian American Fur Company.

Fort Selkirk was the highest point that our steamer was to endeavor to reach, and was far beyond the limit of any previous voyage. It is not the head of steamboat navigation, however, as a light-draft boat, provided with good engines, could certainly ascend as far as Miles cañon and probably even beyond. At our last landing, Mr. Harper, a trader, who had been our fellow-traveller, and his Indian wife and several interesting children, went ashore with his large outfit of trading goods, and at once began preparations for establishing a frontier store in the wilderness. The locality chosen was in a dense forest on the right bank of the river, opposite old Fort Selkirk, the chimneys of which are still standing. A more unpromising place, to an inexperienced eye, for a store could scarcely be fancied. For fully a hundred miles before reaching it, we had not seen a human being not connected with the *Yukon*. Prolonged whistles from the boat, the usual signal for calling the natives, were not answered by a single canoe; and after continuing my journey up stream, I saw scarcely a score of Indians before reaching the coast. The forest where the new station was to be established was tangled and moss covered, and the ground elevated

only a few feet above the summer stage of the stream. Marks on the trees told that floating ice during spring freshets was piled high on the shore. In spite of these discouraging signs, however, the hardy Scotchman, who by the way, was one of the most genial and best informed men that I met in Central Alaska, went quietly on with his preparations for passing another winter as he had done many previous ones, in the solitude of the wilderness. The inducement that lures traders to such remote localities is, of course, the rich furs, at present, with the exception of gold, the sole export of the Yukon region. Beaver, otter, foxes, mink, martin, wolverine, bear, wolves, etc., are more or less plentiful throughout the entire water shed of the Yukon. The skins of these animals are purchased from the Indians, with flour, cotton cloth, tea, and other articles used in domestic life. To the credit of the traders engaged in this occupation, it may be said that they seldom offer the natives "fire water" in exchange for furs.

On reaching Harper's station, I made arrangements with four miners, who had taken passage on the *Yukon* at Forty Mile, to continue on up the river in their company. The most interesting portion of my trip now began. The open boat built by the miners when they began the descent of the Yukon some eighteen months previously, was repaired and the seams covered with pitch gathered from neighboring spruce trees. Supplies were purchased from Mr. Harper, and the long and difficult journey of several hundred miles against strong currents began.



MINERS ASCENDING THE UPPER YUKON.

Each of my companions was provided with a strong pole, about ten feet long, furnished with a spike at one end. Armed with these, two of the men took their stations in the prow of the boat and two in the stern, and by pushing with the poles on the bottom or against the river bank, the boat was forced along. In this mode of navigation the most experienced polemen occupy the

ends of the boat and guide its course. To handle a boat in this manner requires even more skill than when oars are used. Especially is this true, when rounding headlands about which the current is swift. Sometimes when with great labor we had succeeded in

nearly passing a beetling cliff, the rear poleman would be unable to turn the prow towards the bank by forcing his end of the boat out from the shore, and the strong current would immediately sweep us out into mid-stream, where the water was too deep for the poles to reach bottom, and we would be carried far down the river before the rude oars could be brought into play. When swept away from the bank in this manner, we would row across to the opposite shore, usually the concave side of a sharp curve, where eddies tending up stream were to be expected and in the shelter of the next projecting headland regain the space that had been lost.

When the character of the shore would permit, a towing line would be fastened to the side of the boat and the four men would "track" along the bank, while I remained in the boat and guided her course with one of the poles. In this manner we could frequently make better progress than by poling, but, unfortunately, the vegetation overhanging the banks was usually too dense to admit of tracking for any considerable distance.

At noon we rested and cooked a dinner over a small fire, and at night, encamped beneath the shelter of the trees, usually at the lower end of an island, and slept in our blankets on the thick moss, without the protection of a tent. When the weather was stormy, the sail of the boat would be stretched on poles so as to form a "lean-to" and a large fire built in front. With the advance of the season the nights became cold, but this was favorable to us, as the mosquitoes ceased their ravages and allowed us to fully enjoy the beauties of the rugged land through which we were voyaging.

At three localities, viz.: Five Finger rapids, Miles cañon, and at the foot of Lake Lindeman, we were obliged to remove all of our things from the boat and make a portage. At the first-named locality our "outfit" had to be carried over a bold, rocky promontory, while the boat was taken around the point against the surging waters by means of ropes. At Miles cañon the boat itself had to be taken out of the water and carried overland for about a mile. This was the most laborious portion of the journey, but fortunately, we had then been joined by two other parties of miners, numbering six men in all, bound in the same direction as ourselves. By uniting our forces the labor of portaging was lightened for all.

As we neared the end of our journey we entered a region formerly covered by glaciers, and, as is usual where ice sheets have recently departed, found the scenery diversified by beautiful lakes. By means of sail and oars we passed through Lake Lebarge, Lake

Marsh, named in honor of the distinguished professor of palæontology at Yale, Lake Tagish and Lake Lindeman. This portion of the journey was especially enjoyable, as a rest was afforded from the extreme fatigue of forcing our way against the tireless current of the river. The shores of the lakes were gorgeous with autumn foliage, and the air cool and bracing. A few natives were met with in this portion of the route, and although sullen and far less friendly than the inhabitants of the villages farther down the river, they gave us no trouble, but added a touch of life to the wild scenery.

As we neared the head of the river the hills became bolder and more rugged, and glimpses could be had of snow-clad mountains to the southward, across which we must pass before reaching the outskirts of civilization. The prevailing mild and dry summer weather of the interior gave place to clouds and rain. Awakening one morning in a camp beneath spreading spruce trees, on the shore of Lake Tagish, we found our blankets weighted down with snow and the entire landscape white as in mid-winter.

In making the short passage between Lakes Tagish and Lindeman, we suffered the only serious accident of the entire trip. One of the boats was capsized in the swift torrent, and swept against a huge rock with such force that it was crushed and its contents lost. The end of our journey by river was near at hand, however, and the accident did not cause delay.

On reaching Lake Lindeman an hour of hard rowing against a squall from the mountains, and our boat grated on the gravelly beach at the head of the lake, and our boat trip was ended. The country about Lake Lindeman is forested, but the trees are mostly small, and the upper limit of arboreal vegetation on the "timber line" can be seen on the mountains to the south at an elevation of perhaps a thousand feet above the lake's surface. There were no signs of human habitation about the lake. The smoke of our camp fire was the only evidence of life in the wild, dreary landscape. Our boats were taken out of the water and cached in neighboring thickets, together with many articles that could not be carried over the mountains. Although our long journey was nearly ended, so far as measurements in miles was concerned, we had still a difficult and but imperfectly known mountain pass to cross, on which the snows of winter had already begun to accumulate.

At Lake Lebarge we met a single miner who had just crossed the pass to the south, and was on his way to Forty Mile, to try his chances in the alluring gold fields. This fortunate meeting enabled us to purchase a few much-needed supplies, and also to obtain

assistance on the first march up the mountains towards Chilkat pass.

On gaining the highest available clump of balsam trees, we cleared away the snow, then about ten inches deep and still falling, and made preparations for passing the night. We were without anything resembling a tent, so that "going into camp" consisted in building a fire and finding a somewhat sheltered place in which to sleep. I selected a thick low-branching balsam for my house. The lower limbs were cut away and served for a sub-stratum for my bed, while the higher branches retained much of the falling snow. I slept soundly, and on awakening next morning found my bed deeply covered with snow. My blankets had served me on many expeditions for over ten consecutive years, but in spite of some sentiment for them, I was obliged to leave them in this the last of many camps where they had sheltered me.

With a cup of tea and short ration of frying-pan bread and fried bacon for breakfast, each man took a light load of articles that to him seemed most valuable, and we started in single file for the pass. To most of my readers, I fancy, that party of eleven men tramping through the snow, each with a pack on his back and a rude staff in his hand, and dressed in varied costumes that had seen months if not years of hard service, would have appeared as wild and pioneer-like as could well be imagined. The weather was cold and stormy. A chilling wind swept down from the icy mountains, of which only occasional glimpses could be seen through the dense clouds covering their summits. Snow fell from time to time, but between the fierce squalls the sun shone out bright and clear, and revealed fleeting pictures of the rugged land below us to the north. Our course led upward over glaciated rocks, and across snow-filled valleys, toward the dense cloud banks that veiled all beyond.

My companions had crossed the pass on entering the Yukon country, but only one of them had even approached it in the direction we were now travelling, and none of them seemed confident of finding the way when the mountains were cloud covered. After many weary hours of tramping over the roughest of country, where only traces of a trail could occasionally be had through the freshly fallen snow, we gained the base of the heavy cloud banks concealing the mountains. In deep gorges leading upward between neighboring peaks we could see blue glaciers, looking like frozen cataracts descending from unseen regions beyond. In the obscurity of the clouds that enveloped us all was dark and uncertain. Every vestige of a trail had disappeared, and no one knew which of the black



gulches about us would lead to the trail on the other side of the pass. While consulting as to the best plan to follow, some counselling a return to our blankets, where rations sufficient to maintain us for a day or two had been left, I noticed a flock of geese approaching from the north bound on their autumn navigations. They were flying low, just beneath the base of the outward-reaching clouds, and I fancied would choose the lowest gap in the mountains for their passage. In this I was not mistaken, although my companions, not aware, perhaps, that geese once saved Rome, refused to follow the lead of a guide they considered so stupid. After two or three vain trials we again found signs of a trail, and were soon in a narrow gorge with towering peaks on either hand, the summits of which were lost to view in the clouds. After crossing the *névé* of a small glacier so completely shrouded in mist that but little of its character could be seen, we travelled on over smooth bare rocks, and were rejoiced to find that the next stream we reached was flowing southward, and that we had actually crossed the divide between the waters of the Yukon and the streams flowing to Lynn canal. Descending rapidly, along an exceedingly rugged trail, we were soon below the clouds, and a drizzling rain reminded us that we were on the Pacific slope, where days of clear weather are few. As night approached we gained the upper limit of vegetation. Another hour of hard tramping brought us to a dense growth of hemlocks, sheltered in a wild gorge through which a roaring torrent was plunging down to join other similar streams below. Selecting an aged evergreen, whose wide branches reaching far out from the moss-covered trunk touched the ground, we placed our packs beneath it, and cutting a dead tree that stood near, soon had a blazing fire in front of our retreat. Without tents or blankets, and with only a little bread that we carried in our pockets, and a drink of tea for supper, we lay down on the thick, water-soaked moss, each man with his head toward the tree that sheltered us and his feet toward the semicircle of fire, and slept. During the night, as one or another of the party awoke from his uncomfortable slumbers, he would replenish the fire, and, perhaps, stand in front of the cheerful blaze until his benumbed limbs were warmed before joining his slumbering companions.

Of all the wild pictures of camp-life that linger in my memory, there are none more striking than our bivouac beneath the dark hemlocks of Taya valley. My companions, rough and uncouth as men could well be, had been absent from civilization at least a year and a half, and some of them for three years. Their hair and

beards had grown long, and their faces were tanned and weather-beaten by constant exposure. Their garments, then in the last stages of serviceability, had been made by those who wore them, from any material that chanced to be available, from buckskin and fur to flour-sacks, and had been repaired without regard to color or texture. Lying in many positions beneath dripping boughs, with the fire light streaming over them and gleaming on the falling rain drops, they made a picture of frontier life as wild and picturesque as could well be fancied. One not accustomed to the vicissitudes of exploration, coming suddenly on such a scene, would certainly believe he had stumbled on a band of the most desperate outlaws.

When the morning dawned and one after another of the moss-grown trees about us became visible through the white mist, we ate a hasty breakfast, even more frugal than the supper of the previous evening, since only remnants of the former meal remained, and resumed our march. Forcing our way through the wet vegetation we were drenched to the skin, but this was of little moment, since the stream we were following swung from side to side of the valley, and had to be forded many times. The crossing of a rushing torrent of ice-cold water from two to four feet deep is by no means a pleasant experience, neither is it unattended by danger, as was testified by the grave of at least one man, who had been drowned in making the attempt.

There are two ways employed by frontiersmen in crossing dangerous streams when ropes are not to be had. One is for each man to provide himself with a stout stick, answering to an alpenstock, and for all of the men who are to cross, to hold their sticks horizontally before them with their ends overlapping and tightly grasped, thus making practically one continuous pole. The party then enters the stream abreast, and wades slowly across, the tallest and strongest man being placed at the upper end of the line, where the greatest force of the water is experienced. The second plan is to overlap alpenstocks as before, but to enter the water in single file, at right angles to the current; in this way a part of the men are on firm ground in shallow water, and can assist those struggling against the swifter portions of the current.

During our last march we had to cross Taya river some eight or ten times in the manner described above, and for once experience did not breed contempt. Benumbed by the cold, each fresh plunge into the icy waters seemed more trying than the one that preceded it. At last, however, when fatigue and lack of food had begun to

tell on our strength, we saw before us the welcome sight of a chimney rising above the foliage, and in a few moments gained Chilkat village, and found food and rest at the trading post kept by Mr. Haley and his kind-hearted wife.

My companions left the next day or the day following in boats bound down Lynn canal, for the town of Juneau, but I remained a few days for rest and with the aim of seeing something of the mountains and glaciers, for which Lynn canal is justly famed.

A day of brilliant weather, during which I climbed a neighboring mountain peak, more than repaid for the delay. At an elevation of 3,000 feet I crossed the névé of a small glacier and obtained an unobstructed view of the magnificent ice-crowned mountains in which the ancient river valley, now occupied by ocean waters and known as Lynn canal, was carved. From one locality I counted forty glaciers, some of them several miles in length, and a change of position brought still others into view. The outlines of vast amphitheatres could be traced by lines of crags and rock-pinnacles, but the great depressions themselves were filled to overflowing with ice.

On the sides of Taiya valley the upper limit of timber growth or the "timber line," is sharply drawn at an elevation of about 2,500 feet. Above that height the mountains are stern and rugged, while below there is a dense forest of aged hemlocks, festooned with moss. On the day that I looked down into this seemingly enchanted valley the air was clear and sunny in the upper regions, but the great gulf below was filled with drifting vapor. At one moment nothing would be visible but the sombre forest, through which the white vapor was hurrying; and the next, the veil would be swept aside, revealing the mountain spires, snow pinnacles and torquoise-tinted cliffs of ice towering heavenward. These rapidly changing pictures, seen through cloud rifts, seemed glimpses of another world.

Space will not permit me to detain the reader longer. Returning from the mountains I resumed my journey. With a single Indian I made a canoe trip down Lynn canal, a distance of over 100 miles, to the little mining town of Juneau, and from there returned to Puget Sound by steamer.\*

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\* Some account of observations on the geography and surface geology of Alaska, made during the journey described above, may be found in the *Bulletin of the Geological Society of America*, Vol. 1, 1890, pp. 99-162.